

## Doublit: Four to Five



Try your hand at the following doublet devised by the inventor of the genre, Lewis Carroll.

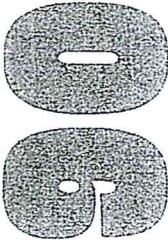
**Change four to five with a minimal number of steps between the two words.**

Did you know that President Bill Clinton is a crossword puzzle aficionado? He even composed an online crossword puzzle for the *New York Times* in 2007.

A bag contains one marble, known to be either white or black. A white marble is dropped inside, the bag shaken, and one drawn out, which also proves to be white. What is now the chance of drawing another white marble?

Lewis Carroll was truly a brilliant puzzle-maker in all genres, not just a maker of doublets. Here's another example from his cunning imagination.

Did you know that Carroll was also a photographer at around the time that photography was invented? He took many photographs that still exist today and are appreciated as art photography. He photographed famous personages, including Lord Salisbury and Alfred, Lord Tennyson.



## Carroll's Bag of Marbles



# ANSWERS

88. Niece. The niece of your mother is your cousin. The mother of your cousin is your aunt (even if only by marriage).

89. FOUR—(1) foul—(2) fool—(3) foot—(4) fort—(5) fore—  
(6) fire—FIVE.

90. Two out of three. We let  $B$  and  $W_1$  stand respectively for the black and white marbles that might be inside the bag at the start, and  $W_2$  for the white marble added to the bag. Removing a white marble from the bag results in three equally likely combinations of two marbles, one inside and one outside the bag:

INSIDE THE BAG	OUTSIDE THE BAG
(1) $W_1$	$W_2$
(2) $W_2$	$W_1$
(3) $B$	$W_2$

(1) In combination 1, the white marble drawn out is the one added to the bag ( $W_2$ ), and the white marble inside it ( $W_1$ ) is the piece originally there.

(2) Combination 2 is the converse of (1): the white marble drawn out is the one originally in the bag ( $W_1$ ), while the white marble inside it ( $W_2$ ) is the one that was added.

(3) In combination 3, the white marble drawn out is the one added to the bag ( $W_2$ ), since there was no white marble originally inside it. The marble that remains in the bag is a black one ( $B$ ).

In two of the three cases, Carroll observes, a white marble remains in the bag. So, the chance of drawing a white marble on the second draw is two out of three.

72

## Math Signs

MATH

Here's a similar puzzle requiring the insertion of math signs.

**Provide the missing signs (+, -, ×, ÷) that will lead to a correct equation:**

$$72 ? 8 = 7 ? 2$$

Sometimes mathematical puzzles show up in the most unexpected places. The Monty Hall Problem was named after Monty Hall, the host of the TV quiz show *Let's Make a Deal*. It goes like this: Suppose you are given the choice of three doors. Behind one door is a car; behind each of the other two doors is a goat. You pick, say, door number 1, but the host, who knows what's behind the doors, opens a different door, number 3, which is hiding a goat. He then asks you, "Would you like to pick door number 2 instead?" What would you say? Is it to your advantage to switch your choice? In fact, it is. It turns out that those who change their answer have a two-thirds chance of winning the car, while those who stick to their choice have only a one-third chance.

73

## Change-a-Letter: Paramour

WORDPLAY

This type of puzzle is a favorite of many puzzle-makers. Here's one more of this kind for you to try.

**Change one letter in a word referring to a glandular organ and you will get a word meaning "paramour!"**

Puzzles that trick us can also frustrate us. Three posts, colored red, white, and blue cast a shadow. Which shadow is the darkest? Shadows are, in fact, all the same hue (dark). But the answer is frustrating if you didn't figure it out yourself, right?

Try your hand at the following cryptogram. **9a**

**This Caesar cipher hides a quotation by Mark Twain from his short novel *The Refuge of the Derelicts* (1905):**

**RFCPCUYQ LCTCP WCR YL SLGLRCPCQRGLE JGDC.**

**Can you decipher it?**

# ANSWERS

dated the girl dressed in red—since this is the only possibility left. The rest is straightforward.

69. *Stop*. All the words are anagrams of each other.

70. Gary, Alex and Tara clearly contradict each other, so one of their statements is true and the other false. Whichever is true, we have now identified that the remaining statements must be false, meaning that Daniela and Gary lied. From this, we can see that Gary, contrary to what he said, is our robber.

$$71. 34 + 43 - 6 = 71.$$

$$72. 72 \div 8 = 7 + 2.$$

73. *Liver*—*Lover*.

74. *Sender*—*Tender*.

75. Rhonda = violinist, Bernard = drummer, Peter = singer, Selena = pianist. We can eliminate Peter as the violinist

because we know he attended many of the pianist's concerts with the violinist. Selena and Bernard can be eliminated, as well, since they often play with the violinist. So, that leaves Rhonda as the violinist. We are told Peter is not the drummer, and again, he has attended the pianist's concerts, so by deduction Peter is the singer. Then Selena is not the drummer because we are told that the drummer often performs with her. She is also not the violinist (Rhonda is) nor the singer (Peter is). So, by elimination she must be the pianist. This leaves the drummer as the only possibility left for Bernard.

92. *There was never yet an uninteresting life*. Each letter has been replaced with the second one before it in the alphabet sequence: T has been replaced by R, H by F, E by C, and so on.

# 30

## Don't Smoke

MATH

Here's a kind of puzzle that requires some truly clever thinking. It also bears an implicit warning about the dangers of smoking.

**Jack used to smoke. One day he decided to quit, cold turkey, after smoking the 27 cigarettes that remained in his pocket. He took out the 27 cigarettes and started to smoke them, one by one. Since it was his habit to smoke only  $\frac{2}{3}$  of a cigarette, Jack soon realized that he could glue three butts together to make another cigarette. So, before giving up his bad habit, how many cigarettes did he end up smoking?**

On the subject of arithmetic, poet Carl Sandburg (1878–1967) offered the following witticism: “Arithmetical is where the answer is right and everything is nice and you can look out of the window and see the blue sky—or the answer is wrong and you have to start over and try again and see how it comes out this time.” It rings true, doesn’t it?

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# 31

## Iron to Lead.

W.H.G. P. 1944

Recall Carroll's doublet from puzzle 19. Carroll later modified the rules to make his puzzles more difficult. Here is the example he used to introduce a new version of the doublet. Can you solve it? Rearranging the letters of a word is, of course, making an anagram of the word.

**Change iron into lead by introducing a new letter or by rearranging the letters of the word at any step. You may not do both in the same step. Each time you must create a genuine word, of course.**

According to some scholars, anagrams originated in the writings of the Greek poet Lycophron (320–280 BCE) who lived in Alexandria. Lycophron's two most famous anagrams were on the names of Ptolemy (100–170) and his queen, Arsinoë, in his famous poem on the siege of Troy titled *Cassandra*. It seems that we have been playing with words forever!

**31.** *Iron*—(1) *icon* (change the *r* in *iron* to *c*)—(2) *coin* (rear-range the letters in *icon*)—(3) *corn* (change the *i* in *coin* to *r*)—(4) *cord* (change the *n* in *corn* to *d*)—(5) *lord* (change the *c* in *cord* to *b*)—(6) *load* (change the *r* in *lord* to *a*)—*Lead* (change the *o* in *load* to *e*). In summary: **IRON**—*icon*—*coin*—*corn*—*cord*—*lord*—*load*—**LEAD**.

**32.** As for the other puzzles in this genre, the final order reflects all the statements. The only order that works (using the players' initials: A = Armand, C = Claudio, S = Shirley, D = Dina, E = Elgin) is A—S—D—E—C. Translate this into the statements made and you will see that it holds.

**33.** *Frank has four children*—three daughters and one son, who is, of course, a brother to the three sisters.

**34.** *729*. The numbers increase as powers of 3:  $3^1$  (= 3),  $3^2$  (= 9),  $3^3$  (= 27), and so on.

**35.**  $T = 3, I = 1, P = 2, A = 5$ .  $TIP + PIT = APA$ :  $312 + 213 = 525$ .

These numerical substitutions are the ones that work mathematically—the solver simply has to do the substitutions to see it.

**36.**  $S = 4, L = 5, O = 0, B = 1, K = 6$ :  $SLOB + BLOL = KOOK$ :  $4501 + 1505 = 6006$ . These substitutions are the ones that work mathematically, as in number 35.

**37.** *Only one*. Only one person was *going* to St. Ives—the narrator! of the rhyme. If you read carefully, you'll see it never says which direction the kits, cats, sacks, and wives were going! In fact, they were *coming* from St. Ives, moving in the opposite direction from the narrator!

**38.** *Time*. Time is indeed both long and short, and so on, as Voltaire points out.

**39.** *Two wrongs do not make a right.*

scenario, since we are asked to weigh the balls no more than twice. So, let's assume that one of the pans goes up, indicating that it contains the culprit ball. Let's eliminate the other three balls. Now, for our second time on the scale, we take the three balls on the pan that went up, put one on the table, and each of the other two on separate pans. There is only one possible outcome left. If the pans balance, then the ball on the table is the culprit ball. Either way, pans goes up, then it contains the culprit ball. Either way, in weighing the balls two times, we are now sure we have identified the ball that weighs less.

**30.** *40 cigarettes*. Jack smoked the 27 cigarettes he took out from his pocket. Since he smoked only  $\frac{2}{3}$  of a cigarette, he therefore would leave a butt equal to  $\frac{1}{3}$  of a cigarette. So, for every 3 cigarettes he smoked, he was able to piece together a new cigarette ( $\frac{1}{3}$  butt +  $\frac{1}{3}$  butt +  $\frac{1}{3}$  butt = 1 new cigarette).

After smoking the original 27 cigarettes, he was thus

able to make 9 new cigarettes. If you stopped here, simply

adding 27 (number of cigarettes Jack smoked originally)

+ 9 (number of new cigarettes made and smoked by Jack) =

36 (total number of cigarettes), you forgot that smoking the

9 new cigarettes also produced butts. In fact, Jack's 9 new pieced-together cigarettes produced 9 new butts of their own. From these 9 butts, Jack was able to make, of course, 3 more cigarettes (3 butts = 1 new cigarette). So, in addition

to the 9 new cigarettes Jack made from the original 27, he was also able to make 3 more from those 9 pieced-together ones. But, then, those 3 extra cigarettes produced 3 butts of their own, from which Jack was able to make yet 1 more cigarette. Altogether, therefore, Jack smoked

$27 + 9 + 3 + 1 = 40$  cigarettes before giving up his bad habit.

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## *Trainspotting, Logically Speaking*

The following is a tricky puzzle in computation. I am not sure where the prototype for the puzzle comes from, but it appears in different guises in many classic collections, so I've included it here.

A train leaves New York for Washington every hour on the hour. Similarly, a train leaves Washington for New York, but it does so every hour on the half-hour. The trip takes five hours each way. If you are on the train from New York bound for Washington, how many of the trains coming from Washington going toward New York would you pass?

The great composer and crossword puzzle-maker Stephen Sondheim once said, "The nice thing about doing a crossword puzzle is, you know there is a solution." Maybe the fact that puzzles have solutions—unlike many other things in life—is what makes them so addictive.

107

## *Which Offer?*

The following is a classic nut in computation—I'm unaware of this one's origin, as well, but it is found all over the puzzle universe. Here's your chance to solve it.

You are offered a part-time job as a pizza delivery person, working only on weekends. Your boss gives you a choice of the following two salary options:  
(1) \$4,000 for your first year of work, and a raise of \$800 for each year after the first, or (2) \$2,000 for your first six months of work, and a raise of \$200 every six months thereafter. Which is the better offer?

Listening to classical music, such as to the symphonies of Wolfgang Amadeus Mozart (1756–1791), seems to reap many cognitive benefits. This is known, rather appropriately, as the "Mozart Effect." Puzzles can also enhance our intellectual skills and can thus be viewed, analogously, as producing the "Puzzle Effect."

# ANSWERS

- 103.** *10 trains.* Let's say that you get on a train at the New York station at 12:00 noon. It could be at any other time of course; the reasoning will be the same. As mentioned in the puzzle, five hours later, at 5:00 PM, your train arrives at the Washington station. Now, you must envision the relative positions of the trains on their way from Washington to New York during those five hours. Keep in mind that the Washington-to-New York trains leave on the half-hour. At the Washington station at 5:00 PM, there is a train ready to leave for New York. Call it A. Obviously, the train that had left the Washington station a half hour earlier, at 4:30 PM, will find itself a certain distance from the Washington station when A is about to leave. Call that train B. You can now complete the diagram showing the relative locations of all the trains leaving the Washington station, bound for New York, between 12:00 PM and 5:00 PM as follows:
- |          |       |            |      |      |      |      |      |      |      |      |  |
|----------|-------|------------|------|------|------|------|------|------|------|------|--|
| NEW YORK |       | WASHINGTON |      |      |      |      |      |      |      |      |  |
| K        | J     | I          | H    | G    | F    | E    | D    | C    | B    | A    |  |
| 12:00    | 12:30 | 1:00       | 1:30 | 2:00 | 2:30 | 3:00 | 3:30 | 4:00 | 4:30 | 5:00 |  |
- Now, when you left the New York station at 12:00 noon, you obviously missed passing the 12:00 K-train that had come from Washington, because it was in the station when your train was leaving. But, as you can see from the diagram above, you passed all the others—the 12:30 J-train (that is, the train that left Washington for New York at 12:30), the 1:00 I-train, the 1:30 H-train, the 2:00 G-train, the 2:30 F-train, the 3:00 E-train, the 3:30 D-train, the 4:00 C-train, the 4:30 B-train, and the 5:00 A-train. That makes 10 trains in all.
- 104.** *Option 2.* After the first year with Option 1, you would receive just the \$4,000. With Option 2 on the other hand, you would receive \$2,000 after the first six months, but then you would get an increase of \$200. So, for the last six months of that year, you would receive \$2,200 dollars. Adding the two semesters up, you would get \$4,200 at the end of the first year, whereas with Option 1 you would get just the \$4,000. Now, what income do both options generate after year two? Well, with Option 1 you would receive an increase of \$800 for the year. So, you would end up earning \$4,800. But with Option 2, you would earn \$2,400 the first semester—the \$2,200 you would have started off with at the beginning of the year (i.e. salary from the previous semester) plus the \$200 raise you would have gotten for that semester. Then, in the last six months you would get another increase of \$200 on top of this new salary. That is, you would earn another \$2,600 (\$2,400 + \$200). Adding up the two semesters, you would receive \$5,000 at the end of the second year. If you continue calculating the incomes generated by the two options in this way, you would see that Option 2 generates more income in the long run, and is therefore the better option.